INTERNATIONAL JOURNAL OF DEVELOPMENTAL NEUROSCIENCE

The Official Journal of the International Society for Developmental Neuroscience

Volume 18, 2000

VOLUME CONTENTS, AUTHOR AND KEYWORD INDEX

Editor-in-Chief:

J. Regino Perez-Polo

Pergamon

INTERNATIONAL JOURNAL OF DEVELOPMENTAL NEUROSCIENCE

The Official Journal of the International Society for Developmental Neuroscience

Editor-in-Chief

J. R. PEREZ-POLO: *Dept. of Human Biological Chemistry and Genetics, UTMB, Galveston, TX* 77555-0652, *U.S.A.*
Fax: 1 409 772 8028, e-mail: regino.perez-polo@utmb.edu

Associate Editors

H. OKANO: *Division of Neuroanatomy* (*D*12), *Department of Neuroscience, Osaka University Graduate School of Medicine*, 2-2 *Yamadaoka, Suita, Osaka* 565-0871, *Japan*

A. PRIVAT: *INSERM U*-336, *USTL—Case Courrier* 106, *Place Eugene Bataillon*, 34095 *Montpellier Cedex* 05, *France*

A. SCHOUSBOE: *Pharma. Biotec. Res. Center, Inst. of Biology B, Universitatesparken* 2, *DK*-2100, *Copenhagen, Denmark*

K. UNSICKER: *Inst. für Anatomie und Zellbiologie III, der Universität Heidelberg, Im Neuenheimer Feld* 307, 69120 *Heidelberg, Germany*

Consulting Editor: E. GIACOBINI, *Geneva, Switzerland.*

International Editorial Board

L. ANGELUCCI, *Rome, Italy*
P. F. BARTLETT, *Victoria, Australia*
E. BOCK, *Copenhagen, Denmark*
M. C. BOHN, *Chicago, IL, U.S.A.*
M. BOTHWELL, *Seattle, WA, U.S.A.*
R. F. BUTTERWORTH, *Montreal, Canada*
A. T. CAMPAGNONI, *Los Angeles, CA, U.S.A.*
M. V. CHAO, *New York, NY, U.S.A.*
D. W. CHOI, *St Louis, MO, U.S.A.*
B. M. CHRONWALL, *Kansas City, MO, U.S.A.*
E. DI CICCO-BLOOM, *Piscataway, NJ, U.S.A.*
D. R. COLMAN, *New York, NY, U.S.A.*
H. CREMER, *Marseille, France*
M. DUBOIS-DALCQ, *Paris, France*
T. EBENDAL, *Uppsala, Sweden*
A. FAISSNER, *Strasbourg, France*
F. H. GAGE, *San Diego, CA, U.S.A.*
V. GALLO, *Bethesda, MD, U.S.A.*
H. GELLER, *Piscataway, NJ, U.S.A.*
K. P. GIESE, *London, U.K.*
G. M. GILAD, *Zrifin, Israel*
A. M. GIUFFRIDA-STELLA, *Catania, Italy*
A. GOW, *New York, NY, U.S.A.*
L. A. GREENE, *New York, NY, U.S.A.*
G. HEINRICH, *Martinez, CA, U.S.A.*
I. A. HENDRY, *Canberra, Australia*
K. IKENAKA, *Aichi, Japan*
B. KEY, *Brisbane, Australia*
S. U. KIM, *Vancouver, BC, Canada*
H. K. KIMELBERG, *Albany, NY, U.S.A.*
N. KOENIG, *Montpellier, France*
G. KREUTZBERG, *Martinsried, Germany*
J. LAUDER, *Chapel Hill, NC, U.S.A.*
D. LINDHOLM, *Uppsala, Sweden*
E. R. MACAGNO, *New York, NY, U.S.A.*
M. P. MATTSON, *Baltimore, MD, U.S.A.*
B. MCEWEN, *New York, NY, U.S.A.*
K. MIKOSHIBA, *Tokyo, Japan*
R. H. MILLER, *Cleveland, OH, U.S.A.*
H. MISAWA, *Tokyo, Japan*
E. MIYAMOTO, *Kumamoto, Japan*
G. MOONEN, *Liege, Belgium*
U. MUELLER, *Basel, Switzerland*
K.-A. NAVE, *Goettingen, Germany*
R. L. NEVE, *Boston, MA, U.S.A.*
L. F. PARADA, *Dallas, TX, U.S.A.*
J. M. PASQUINI, *Buenos Aires, Argentina*
S. E. PFEIFFER, *Farmington, CT, U.S.A.*
D. K. RASSIN, *Galveston, TX, U.S.A.*
M. SCHACHNER, *Hamburg, Germany*
R. SCHLIEBS, *Leipzig, Germany*
E. SHOOTER, *Stanford, CA, U.S.A.*
M. A. SMITH, *Cleveland, OH, U.S.A.*
H. SOBKOWICZ, *Madison, WI, U.S.A.*
N. C. SPITZER, *La Jolla, CA, U.S.A.*
J. D. STEEVES, *Vancouver, Canada*
E. SYKOVA, *Prague, Czech Republic*
E. TIFFANY-CASTIGLIONI, *College Station, TX, U.S.A.*
P. S. TIMIRAS, *Berkeley, CA, U.S.A.*
J. DE VELLIS, *Los Angeles, CA, U.S.A.*
P. WAITE, *Sydney, Australia*
L. WECKER, *Tampa, FL, U.S.A.*
H. WIESINGER, *Tubingen, Germany*
J. WYATT, *London, U.K.*
E. YAVIN, *Rehovot, Israel*

Author Service Department: For queries relating to the general submission of articles (including electronic text and artwork) and the status of accepted manuscripts, please contact the Author Service Department: e-mail: authors@elsevier.co.uk; fax: +44 (0) 1865 843905; tel.: +44 (0) 1865 843900.

Publication information: *International Journal of Developmental Neuroscience* (ISSN 0736-5748). For 2000, volume 18 is scheduled for publication. Subscription prices are available upon request from the Publisher or from the Regional Sales Office nearest you or from this journal's website (http://www.elsevier.nl/locate/ijdevneu). Further information is available on this journal and other Elsevier Science products through Elsevier's website: (http://www.elsevier.nl). Subscriptions are accepted on a prepaid basis only and are entered on a calendar year basis. Issues are sent by standard mail (surface within Europe, air delivery outside Europe). Priority rates are available upon request. Claims for missing issues should be made within six months of the date of dispatch.

Periodicals postage paid at Rahway, New Jersey. *International Journal of Developmental Neuroscience* (ISSN 0736-5748) is published by Elsevier Science Ltd., The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, UK. The annual subscription in the USA is $1171.00.
International Journal of Developmental Neuroscience is circulated by Mercury International Limited, 365 Blair Road, Avenel, NJ 07001, USA.
POSTMASTER: Please send address corrections to: *International Journal of Developmental Neuroscience*, c/o Customer Services, Elsevier Science Inc., 655 Avenue of the Americas, New York, NY 10010, USA.

© 2000 ISDN

Whilst every effort is made by the publishers and editorial board to see that no inaccurate or misleading data, opinion or statement appear in this journal, they wish to make it clear that the data and opinions appearing in the articles and advertisements herein are the sole responsibility of the contributor or advertiser concerned. Accordingly, the publishers, the editorial board and editors and their respective employees, officers and agents accept no responsibility or liability whatsoever for the consequences of any such inaccurate or misleading data, opinion or statement.

Cover figure taken from *International Journal of Developmental Neuroscience* Vol. 17, Nos 5–6, p. 426, 1999, M. Chekenya, H. K. Rooprai, D. Davies, J. M. Levine, A. M. Butt and G. J. Pilkington, The NG2 chondoitin sulfate proteoglycan: role in malignant progression of human brain tumours.

Contents of Volume 18

Number 1

G. Heinrich and **T. Lum**	1	Fish neurotrophins and Trk receptors
F. I. Tarazi and **R. J. Baldessarini**	29	Comparative postnatal development of dopamine D_1, D_2 and D_4 receptors in rat forebrain
G. O'Leary, C. L. Bacon, O. Odumeru, C. Fagan, T. Fitzpatrick, H. C. Gallagher, D. C. Moriarty and **C. M. Regan**	39	Antiproliferative actions of inhalational anesthetics: comparisons to the valproate teratogen
L. A. Miranda and **J. M. Affanni**	47	Thyrotropin-releasing hormone immunoreactivity in the brain and the pituitary during *Bufo arenarum* development
B. Kennedy and **M. G. Ziegler**	53	Ontogeny of epinephrine metabolic pathways in the rat: role of glucocorticoids
H. S. Mogensen and **O. S. Jørgensen**	61	AMPA receptor subunit mRNAs and intracellular $[Ca^{2+}]$ in cultured mouse and rat cerebellar granule cells
M. Holzenberger and **F. Lapointe**	69	Expression of insulin-like growth factor-I (IGF-I) and IGF-II in the avian brain: relationship of in situ hybridization patterns with IGF type 1 receptor expression
L. Miranda-Contreras, L. M. Ramírez-Martens, P. R. Benítez-Diaz, Z. C. Peña-Contreras, R. V. Mendoza-Briceño and **E. L. Palacios-Prü**	83	Levels of amino acid neurotransmitters during mouse olfactory bulb neurogenesis and in histotypic olfactory bulb cultures
S. Biagioni, L. Ciuffini, A. De Jaco, A. L. Vignoli and **G. Augusti-Tocco**	93	Activation of neurospecific gene expression by antennapedia homeobox peptide
E. Hösli, W. Rühl and **L. Hösli**	101	Histochemical and electrophysiological evidence for estrogen receptors on cultured astrocytes: colocalization with cholinergic receptors
B. Majewska and **J. Skangiel-Kramska**	113	Phosphorylated MAP-1B isoforms in the developing mouse barrel cortex
R. Sirear	121	Developmental maturation of the *N*-methyl-D-aspartic acid receptor channel complex in postnatal rat brain
	I	Forthcoming papers

Numbers 2/3

Special Issue: MULTIPLE MECHANISMS IN BRAIN MATURATION AND DEGENERATION

	133	Editorial
F. Gremo	135	Multiple Mechanisms in Brain Maturation and Degeneration
C. Stefanis	137	How I remember Antonia Vernadakis
A. Vernadakis and **H. Fleischer-Lambropoulos**	139	Cell culture as a model to study cell–cell interactions during development aging and neurodegenerative diseases
G. C. Friedman and **N. W. Seeds**	145	Induction of tissue plasminogen activator in differentiated NG108-15 cells
D. L. Davies, I. R. Niesman, F. A. Boop and **K. D. Phelan**	151	Heterogeneity of astroglia cultured from adult human temporal lobe
R. S. Dombro, A. S. Bender and **M. D. Norenberg**	161	Association between cell swelling and glycogen content in cultured astrocytes

J. M. Lauder, J. Liu and **D. R. Grayson**	171	In utero exposure to serotonergic drugs alters neonatal expression of 5-HT_{1A} receptor transcripts: a quantitative RT-PCR study
Z. Gu, J. Yu, K. Werrbach-Perez and **J. R. Perez-Polo**	177	Repeated immunolesions display diminished stress response signal
Z. Gu, L. Cain, K. Werrbach-Perez and **J. R. Perez-Polo**	185	Differential alterations of NF-κB to oxidative stress in primary basal forebrain cultures
L. C. B. Rønn, V. Berezin and **E. Bock**	193	The neural cell adhesion molecule in synaptic plasticity and ageing
S. Arnhold, C. Andressen, D. N. Angelov, R. Vajna, S. G. Volsen, J. Hescheler and **K. Addicks**	201	Embryonic stem-cell derived neurones express a maturation dependent pattern of voltage-gated calcium channels and calcium-binding proteins
H. Cremer, G. Chazal, P. M. Lledo, G. Rougon, M. F. Montaron, W. Mayo, M. Le Moal and **D. N. Abrous**	213	PSA-NCAM: an important regulator of hippocampal plasticity
M. B. Jensen, F. R. Poulsen and **B. Finsen**	221	Axonal sprouting regulates myelin basic protein gene expression in denervated mouse hippocampus
A. Diana, C. Eriksson, B. Winblad and **M. Schultzberg**	237	IL-1β and ICE mRNA are not altered upon β-amyloid$_{25-35}$ induced neurotoxicity in human neuroblastoma cells
G. Dawson	247	Mechanisms of apoptosis in embryonic cortical neurons (E6 and E7) in culture involve lipid signalling, protein phosphorylation and caspase activation
T. Huang, A. G. G. Cheng, H. Stupak, W. Liu, A. Kim, H. Staecker, P. P. P. Lefebvre, B. Malgrange, R. Kopke, G. Moonen and **T. R. R. Van De Water**	259	Oxidative stress-induced apoptosis of cochlear sensory cells: otoprotective strategies
F. Gremo and **M. Presta**	271	Role of fibroblast growth factor-2 in human brain: a focus on development
T. P. Obrenovitch, J. Urenjak, E. Zilkha and **T. M. Jay**	281	Excitotoxicity in neurological disorders — the glutamate paradox
H. Shy, L. Malaiyandi and **P. S. Timiras**	289	Protective action of 17β-estradiol and tamoxifen on glutamate toxicity in glial cells
M. J. Rodríguez, F. Bernal, N. Andrés, Y. Malpesa and **N. Mahy**	299	Excitatory amino acids and neurodegeneration: a hypothetical role of calcium precipitation
J. B. Jensen, D. S. Pickering and **A. Schousboe**	309	Depolarization-induced release of [^{3}H]D-aspartate from GABAergic neurons caused by reversal of glutamate transporters
A. Brusadelli, H. Sialino, T. Piepoli, G. Pollio and **A. Maggi**	317	Expression of the estrogen-regulated gene Nip2 during rat brain maturation
E. Boutou, C. Hurel and **R. Matsas**	321	Early expression of the BM88 antigen during neuronal differentiation of P19 embryonal carcinoma cells
P. Moutsatsou, T. Kazazoglou, H. Fleischer-Lambropoulos, A. M. G. Psarra, A. Tsiapara, C. E. Sekeris, C. Stefanis and **A. Vernadakis**	329	Expression of the glucocorticoid receptor in early and late passage C-6 glioma cells and in normal astrocytes derived from aged mouse cerebral hemispheres
	I	Forthcoming Papers

Numbers 4/5

Special Issue: INTERVENTIONS IN OXIDATIVE STRESS IN BRAIN

	337	Preface
A. M. Di Giulio, E. Germani, E. Lesma, E. Muller and **A. Gorio**	339	Glycosaminoglycans co-administration enhance insulin-like growth factor-I neuroprotective and neuroregenerative activity in traumatic and genetic models of motor neuron disease: a review
P. S. Green and **J. W. Simpkins**	347	Neuroprotective effects of estrogens: potential mechanisms of action
C. De Ruvo, R. Amodio, S. Algeri, N. Martelli, A. Intilangelo, G. M. D'Ancona and **E. Esposito**	359	Nutritional antioxidants as antidegenerative agents
I. Cantuti-Castelvetri, B. Shukitt-Hale and **J. A. Joseph**	367	Neurobehavioral aspects of antioxidants in aging
K. A. Youdim, A. Martin and **J. A. Joseph**	383	Essential fatty acids and the brain: possible health implications
M. Serafini	401	Dietary vitamin E and T cell-mediated function in the elderly: effectiveness and mechanism of action
J. A. Stanford, K. Giardina and **G. A. Gerhardt**	411	In vivo microdialysis studies of age-related alterations in potassium-evoked overflow of dopamine in the dorsal striatum of Fischer 344 rats
G. Perry, A. Nunomura, K. Hirai, A. Takeda, G. Aliev and **M. A. Smith**	417	Oxidative damage in Alzheimer's disease: the metabolic dimension
G. Mehlhorn, M. Hollborn and **R. Schliebs**	423	Induction of cytokines in glial cells surrounding cortical β-amyloid plaques in transgenic Tg2576 mice with Alzheimer pathology
X. Zhu, A. K. Raina, H. Boux, Z. L. Simmons, A. Takeda and **M. A. Smith**	433	Activation of oncogenic pathways in degenerating neurons in Alzheimer disease
C. De-Fraja, L. Conti, S. Govoni, F. Battaini and **E. Cattaneo**	439	STAT signalling in the mature and aging brain
D. Uberti, M. Grilli and **M. Memo**	447	Contribution of NF-κB and p53 in the glutamate-induced apoptosis
Z. Gu, T. Toliver-Kinsky, J. Glasgow, K. Werrbach-Perez and **J. R. Perez-Polo**	455	NGF-mediated alteration of NF-κB binding activity after partial immunolesions to rat cholinergic basal forebrain neurons
S. Scaccianoce, K. Lombardo and **L. Angelucci**	469	Nerve growth factor brain concentration and stress: changes depend on type of stressor and age
S. Thellung, T. Florio, A. Corsaro, S. Arena, M. Merlino, M. Salmona, F. Tagliavini, O. Bugiani, G. Forloni and **G. Schettini**	481	Intracellular mechanisms mediating the neuronal death and astrogliosis induced by the prion protein fragment 106–126
	I	Forthcoming papers
	III	Announcements

Number 6

I. Világi, J. Dóczi and **I. Banczerowski-Pelyhe**	493	Altered electrophysiological characteristics of developing rat cortical neurones after chronic methylmercury chloride treatment

B. Berdel and **J. Moryś** 501 Expression of calbindin-D28k and parvalbumin during development of rat's basolateral amygdaloid complex

M. Afework and **G. Burnstock** 515 Age-related changes in the localization of P2X (nucleotide) receptors in the rat adrenal gland

T. Kita, Y. Matsunari, T. Saraya, K. Shimada, K. O'Hara, K. Kubo, G. C. Wagner and **T. Nakashima** 521 Methamphetamine-induced striatal dopamine release, behavior changes and neurotoxicity in BALB/c mice

M. I. Napp and **J. A. Colombo** 531 Heterochronous maturation of regional brain astroglia: neuronal modulation of striatal glial cells differentiation ex vivo

M. Renis, V. Cardile, M. Palumbo and **A. Russo** 545 ET-18-OCH_3-induced cytotoxicity and DNA damage in rat astrocytes

S. A. Gilmore and **T. J. Sims** 557 Synaptophysin immunoreactivity in spinal white matter of young adult rats

I. Podkletnova, H. Alho, R. Mäkelä, H. Lüddens, P. Helén and **E. R. Korpi** 565 Neonatal 6-hydroxydopamine treatment affects $GABA_A$ receptor subunit expression during postnatal development of the rat cerebellum

P. Humphreys and **W. Hendelman** 573 Analysis of cerebrocortical neuronal migration in three-dimensional fetal mouse cerebral explants: comparison with in vivo

J.-H. F.-H. F. Peng and **P. G. Rhodes** 585 Developmental expression of phospholipase D2 mRNA in rat brain

D. Koczyk and **B. Oderfeld-Nowak** 591 Long-term microglial and astroglial activation in the hippocampus of trimethyltin-intoxicated rat: stimulation of NGF and TrkA immunoreactivities in astroglia but not in microglia

G. Mateu, A. Privat, J. Thibault and **J. Vignon** 607 Modulation of glutamate neurotoxicity on mesencephalic dopaminergic neurons in primary cultures by the presence of striatal target cells

Commentary
D. P. Holschneider and **J. C. Shih** 615 Genotype to phenotype: challenges and opportunities

I Forthcoming papers

Number 7

MOLECULAR MEDIATION OF NEURAL DIFFERENTIATION
Special Issue: In HONOUR OF ANTONIA VERNADAKIS

D. Mangoura 619 Preface

M. A. J. Selleck and **M. Bronner-Fraser** 621 Avian neural crest cell fate decisions: a diffusible signal mediates induction of neural crest by the ectoderm

M. Domowicz, D. Mangoura and **N. B. Schwartz** 629 Cell specific-chondroitin sulfate proteoglycan expression during CNS morphogenesis in the chick embryo

B. Ranscht 643 Cadherins: molecular codes for axon guidance and synapse formation

J. M. Lauder, M. B. Wilkie, C. Wu and **S. Singh** 653 Expression of 5-HT_{2A}, 5-HT_{2B} and 5-HT_{2C} receptors in the mouse embryo

A. Messer and **X. W. Kang** 663 Control of transcription in the RORa-*staggerer* mutant mouse cerebellum: glutamate receptor delta2 mRNA

A. Sidhu and **H. B. Niznik** 669 Coupling of dopamine receptor subtypes to multiple and diverse G proteins

M. C. Bohn, D. A. Kozlowski and **B. Connor** — 679 Glial cell line-derived neurotrophic factor (GDNF) as a defensive molecule for neurodegenerative disease: a tribute to the studies of Antonia Vernadakis on neuronal–glial interactions

D. Mangoura, C. Pelletiere, S. Leung, N. Sakellaridis and **D. X. Wang** — 693 Prolactin concurrently activates Src-PLD and JAK/Stat signaling pathways to induce proliferation while promoting differentiation in embryonic astrocytes

S. Szuchet, K. Watanabe and **Y. Yamaguchi** — 705 Differentiation/regeneration of oligodendrocytes entails the assembly of a cell-associated matrix

I Forthcoming papers

III Announcements

Number 8

K. da Costa Calaza, J. N. Hokoç and **P. F. Gardino** — 721 Neurogenesis of GABAergic cells in the chick retina

P. Milner, A. Loesch and **G. Burnstock** — 727 Endothelin immunoreactivity and mRNA expression in sensory and sympathetic neurones following selective denervation

N. Wilson, E. Esfandiary and **K. S. Bedi** — 735 Cryosections of pre-irradiated adult rat spinal cord tissue support axonal regeneration in vitro

R. Avola, V. Spina-Purrello, F. Gallo, M. C. Morale, N. Marletta, A. Costa, C. Tirolo, N. Testa, S. Reale and **B. Marchetti** — 743 Immortalized hypothalamic luteinizing hormone-releasing hormone (LHRH) neurons induce a functional switch in the growth factor responsiveness of astroglia: involvement of basic fibroblast growth factor

D. A. Zachor, J. F. Moore, C. M. Brezausek, A. B. Theibert and **A. K. Percy** — 765 Cocaine inhibition of neuronal differentiation in NGF-induced PC12 cells is independent of ras signaling

S. P. Fernandes Pereira and **E. Giestal de Araujo** — 773 Chronic depolarization induced by veratridine increases the survival of rat retinal ganglion cells 'in vitro'

G. Johnson and **S. W. Moore** — 781 Cholinesterases modulate cell adhesion in human neuroblastoma cells in vitro

G. R. Reddy and **N. H. Zawia** — 791 Lead exposure alters Egr-1 DNA-binding in the neonatal rat brain

D. W. Singleton, C. Lu, R. Colella and **F. J. Roisen** — 797 Promotion of neurite outgrowth by protein kinase inhibitors and ganglioside GM1 in neuroblastoma cells involves MAP kinase ERK1/2

N. Durany, T. Michel, J. Kurt, F. F. Cruz-Sánchez, J. Cervós-Navarro and **P. Riederer** — 807 Brain-derived neurotrophic factor and neurotrophin-3 levels in Alzheimer's disease brains

O. Ramírez and **E. Jiménez** — 815 Opposite transitions of chick brain catalytically active cytosolic creatine kinase isoenzymes during development

K. Kötter, S. Jin and **J. Klein** — 825 Inhibition of astroglial cell proliferation by alcohols: interference with the protein kinase C-phospholipase D signaling pathway

F. S. Yao, M. T. Caserta and **. M. Wyrwicz** — 833 In vitro ^{1}H and ^{31}P NMR spectroscopic evidence of multiple aberrant biochemical pathways in murine trisomy 16 brain development

S. Cubillos, M. Urbina and **L. Lima** — 843 Differential taurine effect on outgrowth from goldfish retinal ganglion cells after optic crush or axotomy. Influence of the optic tectum

G. A. Kevetter, K. R. Blumberg and **M. J. Correia** — 855 Hair cell and supporting cell density and distribution in the normal and regenerating posterior crista ampullaris of the pigeon

M. Rende, E. Brizi, J. Conner, S. Treves, K. Censier, C. Provenzano, G. Taglialatela, P. P. Sanna and **R. Donato** — 869 Nerve growth factor (NGF) influences differentiation and proliferation of myogenic cells in vitro via TrKA

P. C. Barradas, A. S. Ferraz, A. A. Ferreira, R. P. Daumas and **E. G. Moura** — 887 2′3′cyclic nucleotide 3′phosphodiesterase immunohistochemistry shows an impairment on myelin compaction in hypothyroid rats

893 Erratum

894 Corrigendum

I Forthcoming papers

III Announcements

VII Volume contents

XIII Author Index

XV Keyword Index